



Navigation Systems and Ship's Motion Simulator

The Navigation Systems and Ship's Motion Simulator Laboratory located at SPAWAR Systems Center, San Diego, houses navigation equipment for developing and testing hardware and software for use in surface, subsurface, and airborne platforms. Our laboratory is capable of supporting research, development, testing, and evaluation (RDT&E) work for several types of equipment that is applied in tactical, inertial, and strategic grade navigation.

The primary asset supporting this navigation work is the Ship's Motion Simulator (SMS) Table. The SMS provides a dynamic environment in which testing of navigation equipment can be accomplished under realistic conditions before going out into the Fleet. Extensive operational testing can also be performed without interfering with shipboard operations. By using precise optical procedures and data tables provided by the U.S. Naval Observatory, the SMS is aligned to Polaris as its true north reference. The use of high accuracy time stamps ensures that the data describing the SMS motion corresponds with the output data from the unit undergoing testing. Thus, the table functions as a highly precise, dynamic, and long term test data gathering tool for position and rate information from navigation equipment. The SMS operates while carrying up to 2500 lbs. and is dynamic enough to make even the most seasoned sailor seasick, yet accurate enough to evaluate strategic navigation equipment.

SMS SPECIFICATIONS

- Positions to within 0.6 arc-sec of accuracy with a position resolution of 0.072 arc-sec
- Velocity accurate to within 5 PPM of the rate with a velocity rate resolution of 0.22 arc-sec

Roll:

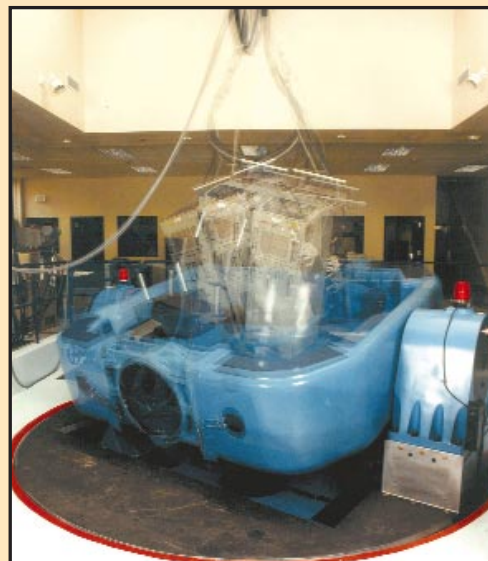
| | |
|------------------|----------------|
| Rotation Range | +/- 40 degrees |
| Maximum Velocity | 36 degrees/sec |

Pitch:

| | |
|------------------|----------------|
| Rotation Range | +/- 35 degrees |
| Maximum Velocity | 37 degrees/sec |

Heading:

| | |
|------------------|----------------|
| Rotation Range | unlimited |
| Maximum Velocity | 25 degrees/sec |



The SMS supports up to 2500 lbs. of equipment during operation.

LABORATORY FUNCTIONS

- Test and evaluate Inertial Navigation Systems (INS) under realistic at-sea conditions
- Facilitate the development of navigation equipment that is integrated to provide the best possible navigation solution (GPS, INS, NAVSSI, Waterspeed Log)
- Test and evaluate Navigation Sensor System Interface (NAVSSI) equipment
- Assist in the development of current INS's and research of future state-of-the-art navigation system technologies (Ring Laser, Fiber Optic Gyros and Accelerometers)

The Navigation Systems and SMS Laboratory also houses and analyzes other navigation equipment such as the AN/WSN-5 inertial navigation system, the AN/WSN-7 (ring laser gyro replacement for the ANWSN-5), and the AN/SSN-6 (Navigation Sensor System Interface - NAVSSI).

For additional information, visit our Website at

<http://www.spawar.navy.mil/depts/d30>

This technology may be the subject of one or more invention disclosures assignable to the U.S. Government.

Licensing inquiries may be directed to

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